Claim Rejections Under 35 U.S.C. §112

Claims 1-5 and 10 are rejected under 35 U.S.C. §112, paragraph 1, as containing subject matter not described in the specification in such a way to reasonably convey to one skilled in the art that the inventor had possession of the claimed invention at the time the application was filed.

Specifically, the Examiner asserts that the recitation of the limitation "does not have means to mix a sample in said cell" in Claim 1 does not appear to have any literal support in the specification, and therefor constitutes new matter. Also, the insertion of the phrase "without active mixing" after "quiescent solution" at page 5, line 7 of the specification introduced added material which is not supported in the original disclosure, thereby introducing new matter. Further, the Examiner asserts that the recitation of the limitation "analyte binding areas comprise liquid impervious sheets" in Claim 10 constitutes new matter as it does not appear to have any literal support in the specification, and the insertion in the specification of the phrase "which is liquid impervious" after "polystyrene sheet 12" at page 10, line 4 introduced added material which is not supported in the original disclosure, thereby introducing new matter.

Applicants respectfully assert that the Examiner's rejection of Claim 1 under the written description requirement of 35 U.S.C. §112, paragraph 1, is not adequately explained and should be withdrawn. The examiner has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in an applicant's disclosure a description of the invention defined by the claims. *In re Wertheim*, 541 F.2d 257, 265, 191 U.S.P.Q. 90, 98 (CCPA 1976); *Ex parte Sorenson*, 3 U.S.P.Q.2d 1562, 1463, (Bd. Pat. App. & Inter. 1987). The Examiner gives no reasons why persons in the

art would not read the specification to clearly convey that the quiescent solution of Appellants' assay device does not employ active mixing of the sample. Applicants believe that the statement that literal support does not exist in no way fulfills the Examiner's initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in Applicants' disclosure a description of the invention defined by the claims.

The phrase "does not provide any literal support" is merely used by the Examiner to mean that the exact same terms are not used in the claims as they are in the specification. It is not necessary that the application describe the claim limitations exactly, but only so clearly that persons of ordinary skill in the art would recognize from the disclosure that applicant's invention included those limitations. *In re Smythe*, 480 F.2d 1376, 178 U.S.P.Q. 179 (CCPA 1973). Applicants respectfully assert that the exact same terms do not have to be used in both the specification and the claims in order to provide literal support. See *In re Smith and Hubin*, 481 F.2d 910, 178 U.S.P.Q. 620 (CCPA 1973). "The claimed subject matter need not be described *in haec verba* in the specification in order for that specification to satisfy the description requirement." *Id.* at 914; see also *In Re Lukach*, 442 F.2d 967, 169 U.S.P.Q. 695 (CCPA 1971). The function of the description requirement in §112 is to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him. How the specification accomplishes this is not material. *In re Smith and Hubin*, 481 F.2d at 914.

Claim 1 includes language that Applicants believe is supported by the specification as originally filed. The recitation "distance wherein said device does not have means to mix a sample in said cell" is a limitation that adequately describes the minimum

distance needed between each working electrode and an adjacent binding area. This distance prevents measurement of interfering amounts of analyte in the nearest adjacent analyte binding area during analysis. Applicants direct the Examiner to page 5, lines 1-17, where it is disclosed that, in a quiescent solution, the closest working distance between a working electrode and an adjacent analyte area sufficient to prevent cross-interference is determined using the Einstein equation, which is a time-dependent equation based on Fickian diffusion.

Also, Example 1 at page 12, lines 5-16 describes how this requisite distance is calculated in practice. One of ordinary skill in the art could determine specific values for the requisite distance needed between each working electrode and an adjacent binding area based on the originally filed disclosure. As such, the specification provides a standard for ascertaining the requisite distance between each working electrode and an adjacent binding area, and one skilled in the art would be reasonably apprised of the scope of the invention when Claim 1 is read in light of the specification.

Similarly, Applicants also respectfully assert that the Examiner's rejection of Claim 10 under the written description requirement of 35 U.S.C. §112, paragraph 1, is not adequately explained and should be withdrawn. The Examiner has merely stated that "the specification does not provide any literal support for the recitation of 'analyte binding areas comprise liquid impervious sheets' in Claim 10." Applicants believe that the fundamental factual inquiry is whether the recitation of "analyte binding areas comprise liquid impervious sheets" in Claim 10 would have been clearly conveyed to those skilled in the art at the time the application was filed. The original specification, by disclosing the term "polystyrene sheet", would be clearly understood by those skilled in the art to comprise a liquid

impervious sheet, regardless of whether the exact phrase "liquid impervious" was initially used.

Indeed, Applicants believe it is clear that polystyrene sheets are clearly conveyed to those skilled in the art to be liquid impervious merely by looking at the drawings. The depiction of a cross-section of the substrate 12 in Figure 2, in which unbroken slanted lines are used, clearly indicates to those skilled in the art that a solid, liquid-impermeable substance is disclosed in the invention. The clarification of this understanding by the addition of the phrase "liquid impervious" is not new matter, but was simply added to more clearly distinguish the present invention from Meyerhoff et al. (US 5,981,203), which teaches a microporous membrane support to solve a perceived problem (see column 3, line 53 to column 4, line 12). Courts have noted that applicants can rely on drawings alone to satisfy the written description requirement. See *In re Reynolds*, 170 U.S.P.Q. 94 (CCPA 1971). In *Reynolds*, the applicant relied merely on Figure 2 of his drawing. The court permitted this, stating:

> by disclosing in a patent application a device that inherently performs a function, operates according to a theory or has an advantage, the patent applicant necessarily discloses that function, theory or advantage even though he says nothing concerning it. The application may later be amended to recite the function theory or advantage without introducing prohibitive new matter.

Id. at 98 (citing *Technicon Instruments Corp. v. Coleman Instruments*, 255 F.Supp. 630 (N.D. IL 1966).

Since Figure 2 of the original specification clearly conveys the substance of Claim 10 to those skilled in the art, regardless of how it accomplishes it, the essential goal

of the description requirement was realized. By disclosing in the application a device that inherently performs the function of being liquid impervious, Applicants necessarily disclosed such function even though they said nothing concerning it. One skilled in the art would clearly appreciate from reading the application and viewing Figure 2 that the structure so claimed is the same structure disclosed. Therefore, the application could later be amended to recite this function without introducing prohibited new matter.

Applicants thus believe that the Examiner should have provided reasons why persons skilled in the art at the time the application was filed would not have recognized the description of the above limitations in the disclosure of the application as filed. If no reasons exist, Applicants were entitled to insert the disputed claim limitations by amendment without adding new matter, because one skilled in the art would appreciate from reading the application that a quiescent solution is one that does not have means to mix a sample, and that a polystyrene sheet is liquid impervious. The structures so claimed are the same structures originally disclosed, and later amendments adding clarifying phrases merely further explained what had been initially disclosed. For the above reasons, Applicants respectfully request the Examiner withdraw the rejection of Claims 1-5 and 10 under 35 USC §112.

Claim Rejections Under 35 USC §102

Claims 1-5 and 10 are rejected under 35 U.S.C. §102(e) as anticipated by Meyerhoff et al. (US 5,981,203)("Meyerhoff") for reasons of record. Applicants respectfully disagree.

Meyerhoff teaches a method for performing a non-separation, enzyme sandwich immunoassay comprising a microporous membrane support separating two chambers. One chamber contains an enzyme-labeled antibody capable of specifically binding to the target analyte, the other chamber contains a substrate for the enzyme (see claim 1). The goal of Meyerhoff is to enable detection of proteins in a complex sample without the need to perform multiple wash steps and/or other manipulative procedures to separate the analyte from the substrate (see column 3, lines 53-61).

It is important to note that, at all times, the Meyerhoff device requires a microporous membrane between two separate chambers (see column 4, lines17-33). In one embodiment, multiple analytes can be measured simultaneously (see column 10, line 66 to column 11, line 5), provided that the substrate is added from a second chamber via a microporous filter, the equivalent to a "back door", in order to reach the surface of the solid phase before it reaches the bulk solution (see column 4, lines1-6 and 54-55).

Meyerhoff is limited in its teaching that the substrate is delivered preferentially to enzyme that is bound to the solid phase, without directly supplying substrate to the excess free enzyme-antibody conjugate in the bulk solution (see column 3, lines 62-66). An immunoassay performed via direct addition of the substrate into the bulk solution is not disclosed by Meyerhoff. With the Meyerhoff device it is not possible to add the substrate directly into the bulk solution containing the enzyme for the substrate, the antibody, and the label because the excess free enzyme-antibody conjugate in the bulk solution would produce large amounts of electrochemically detectable species before the surface enzyme-antibody complexes could react, leading to cross-interference between measuring electrodes.

In contrast, the goal of the present invention is to detect multiple analytes in a single sample by simultaneous amperometric measurements using a quiescent solution and a plurality of working electrodes which are properly spaced. Unlike Meyerhoff, Applicants' device teaches Fickian diffusion in order to eliminate cross-interference between different analytes (see page 5, lines 1-17 and page 12, lines 5-16). An electrode measuring the presence of a certain analyte is separated from the binding area of differing analytes by a predetermined distance, which is estimated by using the Einstein equation. This distance is the minimum distance allowable between the electrode measuring one type of analyte and a second analyte binding site in order to prevent cross-interference.

Further, Applicants' device does not require two separate chambers or a microporous membrane in order to differentiate between different analytes, but instead merely requires a quiescent solution and properly calculated distances between electrodes and adjacent analyte binding areas. There is no need for a precise delivery of the substrate from a second cell, as is required in Meyerhoff's device, but rather the substrate is directly added to the same cell as the test solution, the reagent, and the label. By maintaining a quiescent solution and properly calculating electrode spacing, cross-interference can be minimized without the need for "back door" addition of substrate.

Whereas Meyerhoff teaches a means to measure multiple enzyme-antibody conjugates, possible only via the use of two chambers separated by a microporous filter, Applicants' device is able to distinguish multiple analytes by using only one cell (i.e. chamber), provided the solution is quiescent (see Claim 1). One of skill in the art will appreciate that Applicants' device detects multiple analytes through a different inventive method than Meyerhoff.

Applicants respectfully assert that Meyerhoff does not disclose Applicants' invention because Meyerhoff does not attempt to accomplish multiple analyte determination using a system comparable to Applicants'. Meyerhoff does not teach Fickian diffusion in a quiescent solution as a means to distinguish multiple analytes, and also does not teach the ability to distinguish multiple analytes by using only one cell. As such, Applicants would maintain that the rejection under 35 U.S.C. §102(e) should be withdrawn and accordingly request the same.

CONCLUSION

For the foregoing reasons, Applicants submit that all claims are patentable and a Notice of Allowance is respectfully requested.

Applicants believe that no additional fee is due as a result of this response. If, however, any additional fee or surcharges are deemed due, please charge same or credit any overpayment to deposit account no. 23-3000.

The Examiner is invited to contact the undersigned attorney with any questions or remaining issues.

Respectfully submitted,

WOOD, HERRON & EVANS

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